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Client	STACK
Project No.	P10508
Date	29-Jan-2026
Revision	P03.01
Reference:	MIL09-BWE-XX-XX-CA-E-60001

MIL09

Electrical Calculations

January 2026

REVISIONS

Original document prepared by:		**Original document checked by:**	
Name	Jervin Roi Ramos	**Name**	Janaka Munaweera Thanthrige
Signature		**Signature**	
Date	29.01.2026	**Date**	29.01.2026

Revision:

Revision No.	Date	Revision Details	Approved by
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Document in Progress

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Document in Progress

1.0 FAULT LEVEL AT RACK

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1.1 Introduction

This preliminary calculation outlines the design philosophy applied to the selection of low-voltage circuit protective devices for the data or IT rack power supply. The implemented designs are specifically oriented toward limiting the Prospective Short Circuit Current (PSCC) seen or experienced by the data or IT racks.

The result confirms that the fault level at the IT racks is capped below $10kA_{peak}$, assuring the protection of equipment from damage during fault conditions in conformance with the tenant's SOQ requirements. This verification process has been conducted using Schneider Electric.

1.2 IT Racks and Data Hall Power Infrastructure

The power supplied to the IT racks within the data hall is sourced from the MV/LV distribution transformer and generator. It then distributes through low-voltage switchboards, UPSs, STSs, and busbars and terminates at the endpoint at the IT racks. Refer to the simplified LV distribution block diagram illustrated in **Figure 1** below.

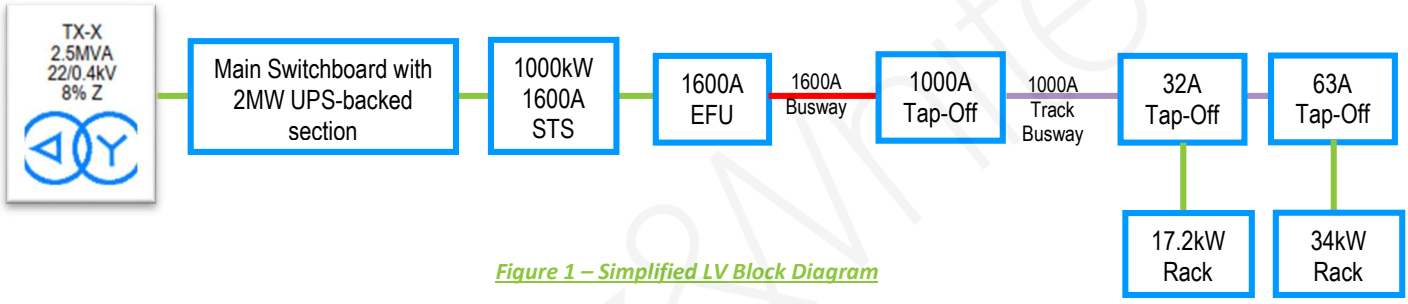

Figure 1 – Simplified LV Block Diagram

Considering the significant ampacity and rating of the LV busway system and the shorter cable lengths, a low-impedance network exists in the LV system infrastructure. To guarantee that the fault at the racks level remains below 10kA, it is imperative to assess and confirm the current limiting capabilities of the tap-off circuit breakers, rated at 63A, in addition to the fault level calculations.

1.3 Prospective Short Circuit Current (PSCC)

The short circuit current at the source has been calculated using the simple infinite bus method. This method calculates the worst possible or maximum current that propagates from the transformer during the fault condition.

The source selected from the transformer has a specified nominal rating of 2500kVA, with voltage ratings of 22/0.4kV and an impedance equal to 8% of the output current. Consequently, the prospective RMS fault level can be determined as follows:

$$In = \frac{2500kVA}{400V\ x\ \sqrt{3}} = 3{,}609A$$

$$Isc = \frac{In\ x\ 100}{Uk\%} = \frac{3609A\ x\ 100}{8\%} = 45.11\text{kA}$$

Based upon the calculation presented, it was determined that the maximum prospective short-circuit current is approximately **$45kA_{rms}$**.

1.4 Preliminary Fault Calculation

Preliminary fault calculation using Amtech ProDesign version 22.0.28.8 is presented in Figure 2 below, wherein shortest distances as per the layout were considered. This verifies the worst-case fault level at rack is designed at 10kA.

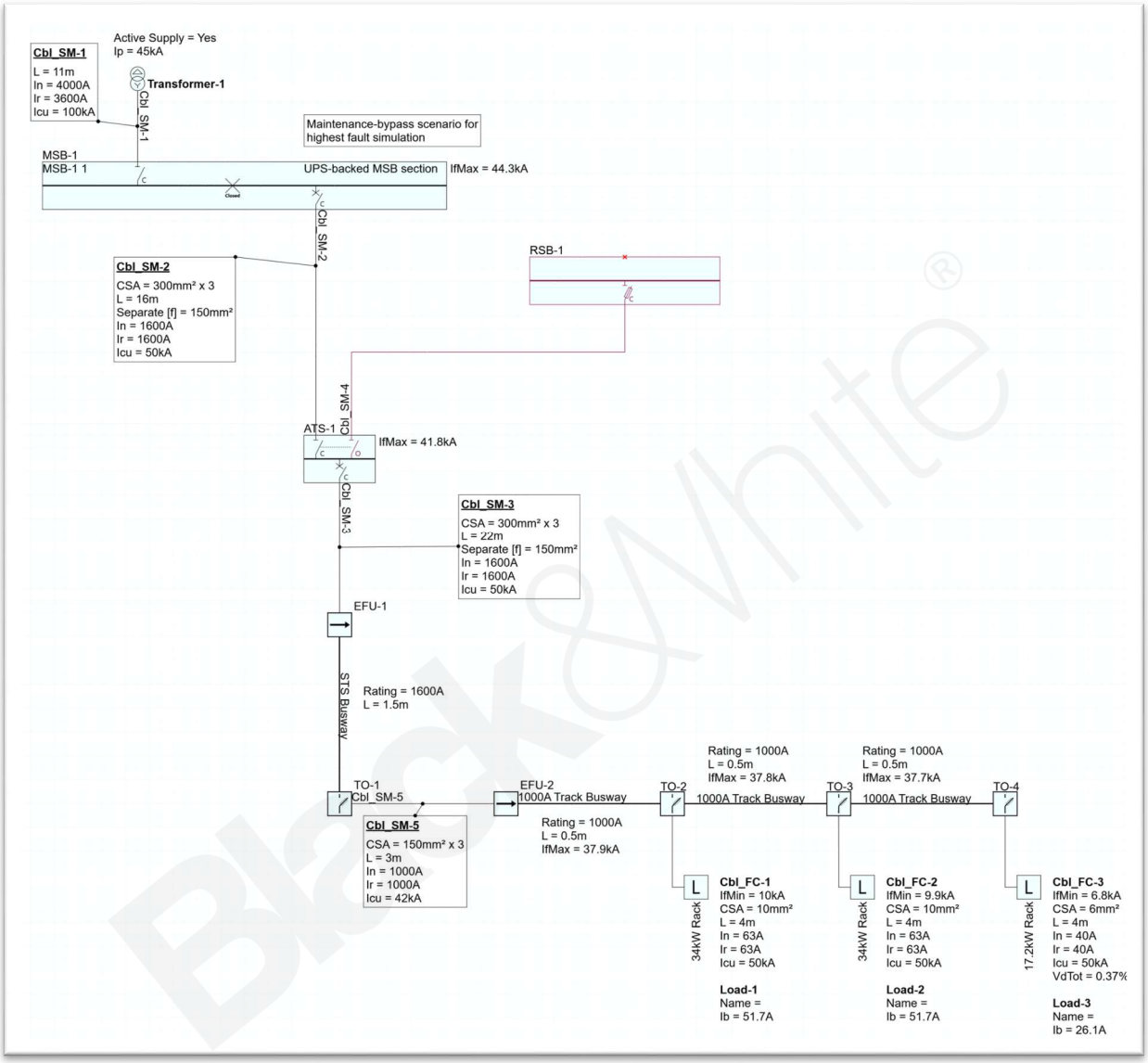

Figure 2 – Preliminary Amtech Calculation

1.5 Current-limiting Circuit Breaker Characteristics

To further support and ensure the fault level will be limited to 10kA, current-limiting property of the final tap-off breakers are investigated.

As per IEC 60947-2, a current-limiting circuit breaker is a breaker type with a sufficient short trip time enough to prevent the short-circuit current from reaching the peak value. The limiting capacity of the circuit breaker indicates its ability to let through or determine a current lower than the prospective fault current during short-circuit conditions. This characteristic is represented by two different curves illustrated in **Figure 3** below.

The limiting capability of the breaker is often due to the rotating double-break technique, i.e. very rapid repulsion of contacts and the appearance of two arc voltages in series with a very steep wave front. Refer to **Figure 3** below for illustration.

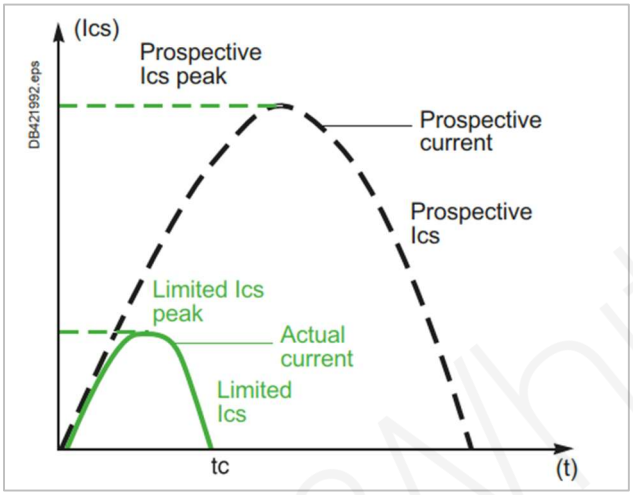

Figure 3 – SE's Circuit Breaker Current-Limiting Curve

1.6 Schneider (SE) Circuit Breaker Current-limiting Verification

The verification of Schneider Electric's circuit breakers' current-limiting capability involved referencing the current-limiting curve published in the catalog, followed by discussions with the global SE technical team. The verification procedure is described below.

- **Schneider NG125 63A MCB current-limiting capacity**

  The 1000A busway positioned above the racks receives power from a 1000A MCCB busway tap-off. In fault conditions, the MCCB functions only as a protective device, as circuit breakers above 630A typically do not operate as fault current-limiting devices. Therefore, downstream of the 1000A busway, the Schneider NG125L MCB tap-off unit will serve to protect the IT racks and will reduce the fault current to the targeted 10kA peak or less.

  Referring to the current limiting curve depicted in **Figure 3** below, for NG125L MCBs up to 63A, fault currents of up to $50kA_{rms}$ are limited to below the desired $10kA_{peak}$ threshold.

  From the curve, considering a worst-case upstream fault of 45kA, the NG125L 63A MCB will limit the fault to a peak of approx. 9.7kA. Furthermore, factoring in the distance from the transformer to the MCB tap off unit above the rack, the fault shall be further reduced below the estimated peak of 9.7kA.

Technical Advice

Short-circuit current limiting (cont.)

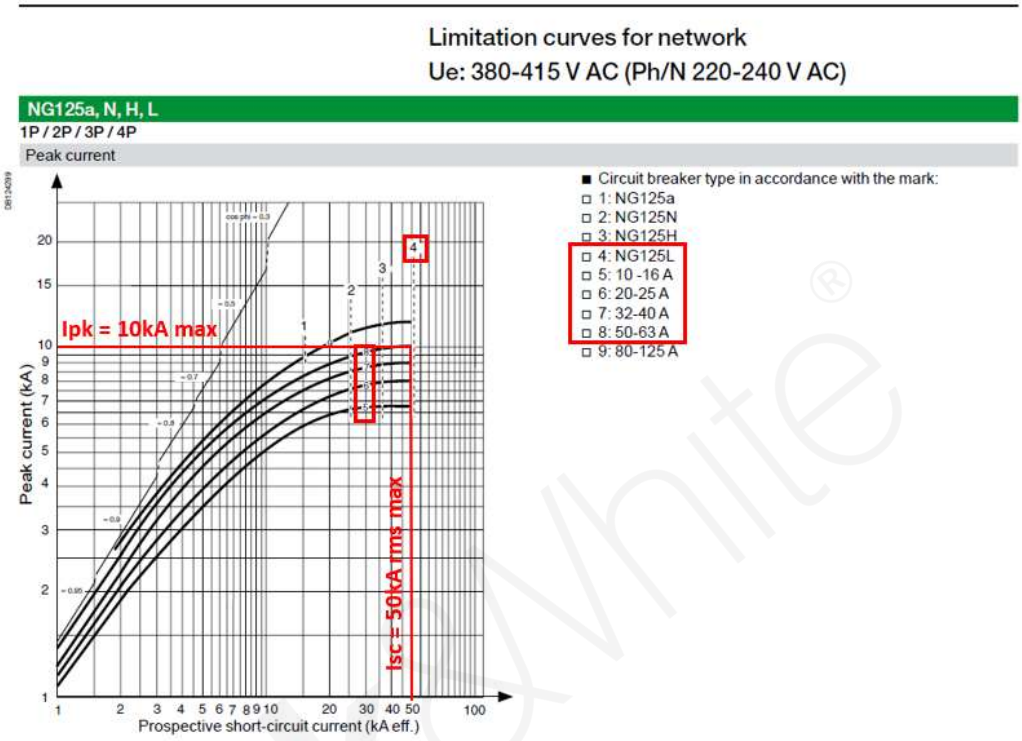

Figure 3 – NG125 Circuit Breakers Current Limiting Curve

The tables and values referenced above are sourced from Schneider Electric's catalogue and datasheet. Schneider's technical representatives recommend incorporating a 10% tolerance when applying these values to address potential variations or uncertainties in real-world applications. This precaution enhances the reliability and performance of the equipment.

1.7 Summary

The preliminary calculations demonstrate that the design will limit the fault current to less than 10kA$_{peak}$. Moreover, the current-limiting characteristics of Schneider circuit breakers have been verified and the results confirm that the fault at the racks level is comfortably below the threshold limit of 10kA$_{peak}$.

The fault currents at the racks level or downstream of the circuit breakers are summarized as follows:

- **Schneider Electric Circuit Breakers**

  The NG125 63A MCB is expected to further limit the fault current to approx. 9.7kA$_{peak}$, which is approx. 6.85kA$_{rms}$, below the desired 10kA threshold. NG125 32A MCB follows the same principle.

2.0 PEAK AND ANNUALIZED PUE CALCULATION

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Summary			
PROJECT TITLE	MIL09 (48 MW)		
PROJECT NUMBER	P10508	DATE	29-Jan-26
PURPOSE OF ISSUE	Stage 4	REV	P03.01

Annual Power Consumption Summary

Annual Power consumed (kWh)

Equipment Description	25%	50%	75%	100%
ACC abs power at N+2	12545796	25091593	37637389	50183186
Frost protection heating (kWh) at N+2	740600	634800	529000	423200
Data Hall FWU, N + 2	1617636	3911308	7536985	13150629
Data Hall CDU, N + 2	1533021	3264100	5385415	8089141
MMR, CRAH N + 1	535	3067	9182	20461
Electrical room cooling, N + 2	5901	123425	841155	2025255
Reserve substation, N + 1	692	10113	66200	165001
Admin Electrical room cooling, N + 1	200	2255	13589	33132
CHW pump power, N + 1	794595	1854054	3178378	4661621
Mechanical UPS losses	31784	74162	127135	186465
STS Losses	1229904	1766016	2396736	3153600
IT UPS losses	3784320	6727680	10406880	15557760
HVAC cooling components	7884000	7884000	7884000	7884000
General lighting & small power	3835970	3835970	3835970	3835970
Office areas	699679	699679	699679	699679
MV / LV Transformer Losses	237702	851591	2256674	4881052
Total	34942335	56733814	82804366	114950151
aPUE	**1.3324**	**1.2699**	**1.2626**	**1.2734**

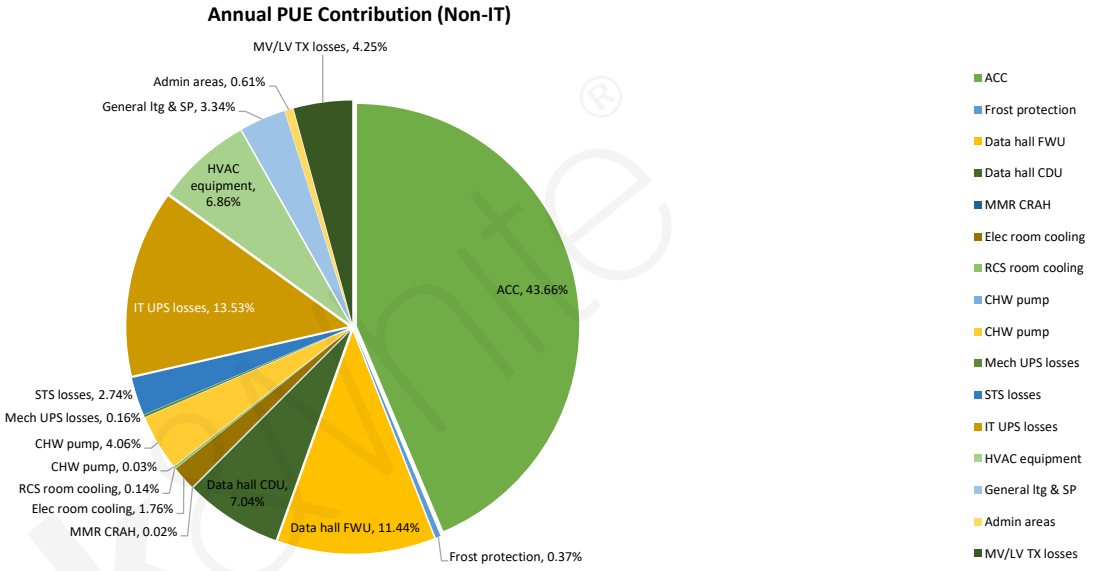

Figure 1: Annual PUE breakdown (non IT loads)

Assumptions:

1. The PUE calculation is based on the assumption of constant IT, i.e. no fluctuation throughout the year.
2. The calculation is on the assumption of normal operation conditions (i.e. no failures) for the entire annual period.
3. On the basis of Note 2, charging current of the UPS has been omitted.
4. Load relating to critical load only has been considered for the PUE calculation, including the following:
   a. UPS Losses
   b. Critical chilled water infrastructure relating to the data halls, switchrooms and MMR rooms only.
   c. Associated services for the operation of the critical load: general lighting and power to critical areas and controls load.
   d. Datahall pressurisation.
   e. Generator Loads.
   f. Physical Security.
5. Annual hourly data is based on the ASHRAE International Weather data for Energy Calculations (IWEC2) weather files.
6. PUE Calculations are based on pre-construction and procurement level of information.
7. PUE calculations are based on generic equipment selections are do not represent final procured equipment.
8. PUE calculation is based on industry general standard operating procedures.
9. Design is based on 48MW of IT capacity, with no tape store.
10. Design is based on IT room delta T of 13.9°C.
11. Heat export and reduced operations of heat rejection plant is not included and has been considered separate from this PUE calculation.

Summary			
PROJECT TITLE	**MIL09 (48 MW)**		
PROJECT NUMBER	**P10508**	**DATE**	**29-Jan-26**
PURPOSE OF ISSUE	**Stage 4**	**REV**	**P03.01**

Peak Power Consumption Summary

Peak power consumed (kWh)

Equipment Description	Peak IT load
ACC abs power at N+2	16500
Data Hall FWU, N + 2	1501
Data Hall CDU, N + 2	923
MMR, CRAH N + 1	2
Electrical room cooling, N + 2	231
Reserve substation, N + 1	19
Admin Electrical room cooling, N + 1	4
CHW pump power, N + 1	532
Mechanical UPS losses	21
STS Losses	360
IT UPS losses	1776
HVAC cooling components	900
General lighting & small power	182
Office areas	80
Transformers	952
Total	23984
pPUE	**1.4997**

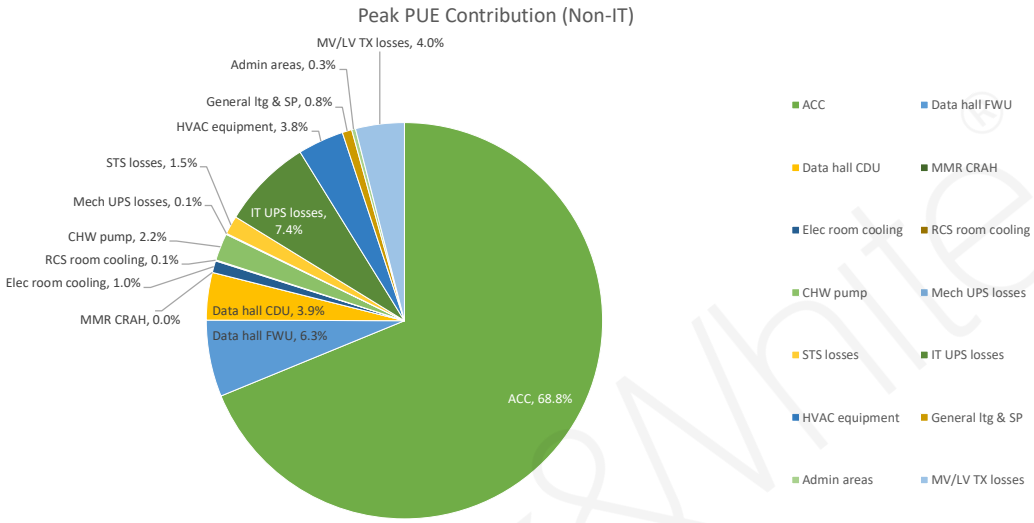

Figure 2: Peak PUE breakdown (non IT loads)

Assumptions:

1. The PUE calculation is based on the assumption of constant IT, i.e. no fluctuation during the peak hour.
2. The calculation is on the assumption of normal operation conditions (i.e. no failures or planned maintenance).
3. On the basis of the above note, charging current of the UPS has been omitted.
4. Load relating to critical load only has been considered for the PUE calculation, including the following:
   a. UPS Losses
   b. Critical chilled water infrastructure relating to the data halls, switchrooms and MMR rooms only.
   c. Associated services for the operation of the critical load: general lighting and power to critical areas and controls load.
   d. Datahall pressurisation.
   e. Generator Loads.
   f. Physical Security.
5. Peak PUE is based on an ambient temperature of the ASHRAE 2021 n=20 years for the relevant ASHRAE Weather Station.
6. PUE Calculations are based on pre-construction and procurement level of information.
7. PUE calculations are based on generic equipment selections and do not represent final procured equipment.
8. PUE calculation is based on industry general standard operating procedures.
9. Design is based on 48MW of IT capacity, with no tape store.
10. Design is based on IT room delta T of 13.9 °C.
11. Heat export and reduced operations of heat rejection plant is not included and shall be considered.

Project: P10508 - MIL09
Document: Load Calculation
Sheet: Building Load Profile
Revision: P03.01
Date: 1/29/2026
Author: JRR

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Building Load Profile

Substation		Operating Load w/ Losses			Failure Load w/ Losses		
		kW	kVA	A	kW	kVA	A
12MW IT 6+1							
PCS	A1	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	B1	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	C1	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	D1	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	E1	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	F1	2287.54	2312.72	3338.12			
RCS	R1	90.65	94.66	136.63	2190.81	2302.25	3323.01
12MW IT 6+1							
PCS	A2	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	B2	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	C2	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	D2	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	E2	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	F2	2287.54	2312.72	3338.12			
RCS	R2	90.65	94.66	136.63	2190.81	2302.25	3323.01
12MW IT 6+1							
PCS	A3	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	B3	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	C3	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	D3	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	E3	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	F3	2287.54	2312.72	3338.12			
RCS	R3	90.65	94.66	136.63	2190.81	2302.25	3323.01
12MW IT 6+1							
PCS	A4	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	B4	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	C4	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	D4	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	E4	2287.54	2312.72	3338.12	2305.58	2418.18	3490.34
PCS	F4	2287.54	2312.72	3338.12			
RCS	R4	90.65	94.66	136.63	2190.81	2302.25	3323.01
Admin Block							
ABS	O	786.17	802.14	1157.80	1228.27	1250.96	1805.61
Mechanical							
PMS	X1	1793.60	1890.21	2728.29			
PMS	Y1	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	Z1	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	V1	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	W1	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	X2	1793.60	1890.21	2728.29			
PMS	Y2	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	Z2	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	V2	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
PMS	W2	1793.60	1890.21	2728.29	2225.60	2345.41	3385.30
Maximum Load		**73985.79**	**75588.11**	**109102.04**	**73908.01**	**77586.72**	**111986.78**

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Project: P1508 - MIL09
Document: Load Calculation
Sheet: Design Criteria
Revision: P03.01
Date: 1/29/2026
Author: JRR

Basis of Design

Criteria		
IT Load	48	MW
IT String Load	2	MW
High Density Datahall IT Load	6	MW
MMR Load	0.02	MW
Phase 1 IT Load	12	MW
IT Load pf	0.95	
IT Power Utilisation	100%	
Redundant FWUs per datahall	2	
Redundant Primary CHW Pumps / Circuit	1	
Redundant CDU's per datahall	2	
IT UPS battery recharge restriction	5%	
UPS efficiency	96%	
UPS battery autonomy	5	min
UPS Input Power Factor	0.99	
UPS utilisation factor	100%	
Substation transformer utilisation factor	100%	
Distribution losses	1.5%	
Generator utilisation factor	100%	
Generator Load Power Factor	0.8	

Project: P10508 - MIL09
Document: Load Calculation
Sheet: Primary Critical Substation
Revision: P03.01
Date: 1/29/2026
Author: JRR

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Generator

Item	Utilisation (Failure)	Available Capacity kW	kVA	A	Required Capacity kW	kVA	A		Spare kW
Typical 3000kVA	99%	2400	3000	4330	2378	2406	3422		21.94

Package Substation Transformer

Item	Utilisation (Failure)	Available Capacity kVA	A	Required Capacity kW	kVA	A		Spare kVA
Cast Resin AN Transformer	98%	2500	3608	2340	2454	3490		45.55
				PF	0.95			

Input Switchboard

Circuit	Load	Normal Operating Load kW	kVA	A	Transformer Worst Case Load kW	kVA	A	CPD A	Oper Loss W	Fail Loss W	Generator Load kW	kVA	A
	Switchgear Operating Losses								8470	8654			
1	Utility Incomer	2288	2313	3338	2306	2418	3490	4000	3000	3000			
2	Generator Incomer							4000	25	25	2343	2371	3422
3	AUX-PCS	12	13	19	12	13	19	100	35	35	12	13	19
4	Generator auxiliaries [IT]	30	33	48	30	33	48	100	35	35	30	33	48
5	Maintenance Bypass (Mech UPS)							630					
6	300 kVA Static UPS	162	164	236	218	220	317	630	96	280	218	220	317
7	300 kVA Charging				6 *	6 *	9 *						
8	Maintenance Bypass (IT)							3200					
9	1125 kVA Static UPS	1042	1052	1519	1000	1053	1519	2000	1152	1152	1042	1052	1519
10	1125 kVA Static UPS	1042	1052	1519	1000	1053	1519	2000	1152	1152	1042	1052	1519
11	1000 kVA Charging				20 *	20 *	29 *						
12	1000 kVA Charging				20 *	20 *	29 *						

*Charging set to 10% of charging load

Normal Operating Load Scenario

- UPS should not be charging and mech equipment can be maintained

Transformer worst case load

- return of utility power (UPS batteries has discharged due to transition to generator source).
- UPS in maintenance bypass and IT load at 0.95PF.

Transformer worst case load accounts for:

- N operation of FWUs and CDUs
- N operation of CHW pumps
- MIL09-DBMMR-A1-001 at 40kW (Admin block failure).

Project: P10508 - MIL09
Document: Load Calculation
Sheet: Primary Critical Substation
Revision: P03.01
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Author: JRR

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IT UPS Output Switchboard

Circuit	Load	Operating Load			Failure Load			CPD	Oper Loss	Fail Loss
		kW	kVA	A	kW	kVA	A	A	W	W
	Switchgear Operating Losses								9904	9904
1	1125 kVA Static UPS	1000.00	1052.63	1519.34	1000.00	1052.63	1519.34	2000	1152	1152
2	1125 kVA Static UPS	1000.00	1052.63	1519.34	1000.00	1052.63	1519.34	2000	1152	1152
	With UPS Efficiency @ 0.96%	1041.67	1052.19	1518.70	1041.67	1052.19	1518.70	-	-	-
3	Bus Coupler	2083.33	2104.38	3037.41	2083.33	2104.38	3037.41	3200	2680	2680
4	Maintenance Bypass							3200	25	25
5	STS (Normal)	500.00	526.32	759.67	500.00	526.32	759.67	1000	560	560
6	EFU	500.00	526.32	759.67	500.00	526.32	759.67	1000	560	560
7	EFU	500.00	526.32	759.67	500.00	526.32	759.67	1000	560	560
8	STS (Normal)	500.00	526.32	759.67	500.00	526.32	759.67	1000	560	560

MUPS Output Switchboard

Circuit	Load	Operating Load			Failure Load			CPD	Oper Loss	Fail Loss
		kW	kVA	A	kW	kVA	A	A	W	W
	Switchgear Operating Losses								438	990
1	300 kVA Static UPS	155.72	172.04	248.32	208.88	229.94	331.89	630	96	280
	With UPS Efficiency @ 0.96%	162.21	163.85	236.49	217.58	219.78	317.23	-	-	-
2	Bus Coupler	162.21	163.85	236.49	217.58	219.78	317.23	630	96	280
3	Maintenance Bypass							630	25	25
4	FWU & CDU BB	71.00	78.89	113.87	98.80	109.78	158.45	250	80	80
5	Chilled Water Pump	21.16	23.51	33.94	23.84	26.49	38.23	100	35	35
6	Chilled Water Pump	21.16	23.51	33.94	23.84	26.49	38.23	100	35	35
7	ACC Controls	5.00	5.56	8.02	5.00	5.56	8.02	40	35	35
8	ACC Controls	5.00	5.56	8.02	5.00	5.56	8.02	40	35	35
9	Critical DB	5.00	5.26	7.60	5.00	5.26	7.60	100	35	35
10	MIL09-DBMMR-A1-001	20.00	21.05	30.39	40.00	42.11	60.77	100	35	35
11	PCS LV CRAH [2+1]	5.70	6.71	9.68	5.70	6.71	9.68	40	35	35
12	PCS STS CRAH [1+1]	1.70	2.00	2.89	1.70	2.00	2.89	40	35	35

*Note: MIL09-DBMMR-A1-001 , 4no DH DBC, MIL09-SSB-O/F1-002 is present from PCS-A1 to PCS-F1 respectively.

*MIL09-DBMMR-A1-001 is only at 40kW in the event of failure of the admin block.

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Project: P10508 - MIL09
Document: Load Calculation
Sheet: Reserve Critical Substation
Revision: P03.01
Date: 1/29/2026
Author: JRR

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Generator

Item	Utilisation (Failure)	Available Capacity kW	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A		Spare kW
Typical 3000kVA	94%	2400	3000	4330	2262	2289	3255		138.43

Package Substation Transformer

Item	Utilisation (Failure)	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A		Spare kVA
Cast Resin AN Transformer	93%	2500	3608	2224	2337	3323		163.22
				PF	0.95			

Input Switchboard

Circuit	Load	Normal Operating Load kW	Normal Operating Load kVA	Normal Operating Load A	Transformer Worst Case Load kW	Transformer Worst Case Load kVA	Transformer Worst Case Load A	CPD A	Oper Loss W	Fail Loss W	Generator Load kW	Generator Load kVA	Generator Load A
	Switchgear Operating Losses								315	8454			
1	Utility Incomer	90.65	95	137	2191	2302	3323	4000	80	3000			
2	Generator Incomer							4000	25	25	2228	2255	3255
3	AUX-RCS	12	13	19	12	13	19	100	35	35	12	13	19
4	Generator auxiliaries [IT]	30	33	48	30	33	48	100	35	35	30	33	48
5	Maintenance Bypass (Mech UPS)							630					
6	300 kVA Static UPS	49	49	71	103	104	150	630	35	80	103	104	150
7	300 kVA Charging				6 *	6 *	9 *						
8	Maintenance Bypass (IT)							3200					
9	1125 kVA Static UPS	0	0	0	1000	1053	1519	2000	25	1152	1042	1052	1519
10	1125 kVA Static UPS	0	0	0	1000	1053	1519	2000	25	1152	1042	1052	1519
11	1000 kVA Charging				20 *	20 *	29 *						
12	1000 kVA Charging				20 *	20 *	29 *						

*Charging set to 10% of charging load

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Document: Load Calculation
Sheet: Reserve Critical Substation
Revision: P03.01
Date: 1/29/2026
Author: JRR

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IT UPS Output Switchboard

Circuit	Load	Operating Load			Failure Load			CPD	Oper Loss	Fail Loss
		kW	kVA	A	kW	kVA	A	A	W	W
	Switchgear Operating Losses								100	7664
1	1125 kVA Static UPS	0.00	0.00	0.00	1000.00	1052.63	1519.34	2000	25	1152
2	1125 kVA Static UPS	0.00	0.00	0.00	1000.00	1052.63	1519.34	2000	25	1152
	With UPS Efficiency @ 0.96%	0.00	0.00	0.00	1041.67	1052.19	1518.70	-	-	-
3	Bus Coupler	0.00	0.00	0.00	2083.33	2104.38	3037.41	3200	25	2680
4	Maintenance Bypass							3200	25	25
5	Reserve Bus Design Load	0.00	0.00	0.00	2000.00	2105.26	3038.69	3200	25	2680
6										

MUPS Output Switchboard

Circuit	Load	Operating Load			Failure Load			CPD	Oper Loss	Fail Loss
		kW	kVA	A	kW	kVA	A	A	W	W
	Switchgear Operating Losses								175	355
1	300 kVA Static UPS	46.70	51.97	75.01	98.70	109.75	158.41	630	35	80
	With UPS Efficiency @ 0.96%	48.65	49.14	70.92	102.81	103.85	149.90	-	-	-
2	Bus Coupler	48.65	49.14	70.92	102.81	103.85	149.90	630	35	80
3	Maintenance Bypass							630	25	25
4	FWU & CDU BB Reserve	36.00	40.00	57.74	88.00	97.78	141.13	250	35	80
5	Critical DB	5.00	5.26	7.60	5.00	5.26	7.60	100	35	35
6	PCS LV CRAH [2+1]	5.70	6.71	9.68	5.70	6.71	9.68	100	35	35

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Sheet: Primary Mechanical Substation
Revision: P03.01
Date: 1/29/2026
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Generator

Item	Utilisation	Available Capacity kW	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A	Operating Losses kW	Spare kW
Typical 3000kVA	94%	2400	3000	4330	2246	2367	3366		154.09

Package Substation Transformer

Item	Utilisation (Failure)	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A	Operating Losses kW	Spare kVA
Cast Resin AN Transformer	95%	2500	3608	2259	2381	3385	18	119.41
				PF	0.95			

Input Switchboard

Circuit	Load	Normal Operating Load kW	Normal Operating Load kVA	Normal Operating Load A	Transformer Worst Case Load kW	Transformer Worst Case Load kVA	Transformer Worst Case Load A	CPD A	Oper Loss W	Fail Loss W	Generator Load kW	Generator Load kVA	Generator Load A
	Switchgear Operating Losses								5920	6560			
1	Utility Incomer	1794	1890	2728	2226	2345	3385	4000	2680	3000			
2	Generator Incomer							4000	25	25	2213	2332	3366
3	PMS CRAH [1+1]	2	2	3	2	2	3	40	35	35	2	2	3
4	AUX-PMS	12	13	19	12	13	19	100	35	35	12	13	19
5	Generator auxiliaries [IT]	30	33	48	30	33	48	100	35	35	30	33	48
6	MIL09-DB-O-002	22	23	33	22	23	33	100	35	35	9	9	14
7	Chiller ACC 1	432	455	656	432	455	656	800	560	560	432	455	656
8	Chiller ACC 2	432	455	656	432	455	656	800	560	560	432	455	656
9	Chiller ACC 3	432	455	656	432	455	656	800	560	560	432	455	656
10	Chiller ACC 4	432	455	656	432	455	656	800	560	560	432	455	656
11	Chiller ACC 5				432	455	656	800	25	560	432	455	656
12	Chiller ACC 6							800					
13	Chiller ACC 7							800					
14	Chiller ACC 8							800					
15	MIL09-SSB-O/V1-001	0	0	0	0	0	0	630	25	25	52	54	78

*Transformer worst case load - Failure of one PMS. Fire scenario not considered as that would be two failures (Failure of PMS + Failure of ABS).
*Secondary supply for fire life safety board from PMS-V1 only.

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Project: P10508 - MIL09
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Generator

Item	Utilisation (Failure)	Available Capacity kW	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A		Spare kW
Typical 1500kVA	66%	1200	1500	2165	798	814	277		402.04

Package Substation Transformer

Item	Utilisation (Failure)	Available Capacity kVA	Available Capacity A	Required Capacity kW	Required Capacity kVA	Required Capacity A		Spare kVA
Cast Resin AN Transformer	54%	1500	2165	798	814	1158		685.82
				PF	0.98			

Input Switchboard

Circuit	Load	Total Connected Load kW	Total Connected Load kVA	Total Connected Load A	Maximum Demand Load kW	Maximum Demand Load kVA	Maximum Demand Load A	CPD A	Oper Loss W	Fail Loss W	Fire Load kW	Fire Load kVA	Fire Load A
	Switchgear Operating Losses								4916	3287			
1	Utility Incomer	1228	1251	1806	786	802	1158	4000	1500	900			
2	Generator Incomer							4000	25	25	185	192	277
3	ABS CRAH [1+1]	1.7	2.0	2.9	1.7	2.0	2.9	40	35	35	2	2	3
4	Generator auxiliaries [ABO]	26.0	28.9	41.7	26.0	28.9	41.7	100	35	35	26	29	42
5	AUX-ABS	12.0	13.3	19.2	12.0	13.3	19.2	100	35	35	12	13	19
6	Maintenance Bypass							400					
7	160 kW Static UPS	128.2	129.5	186.9	94.0	95.0	137.1	400	96	80	94	95	137
8	160 kW Charging	16.0	16.2	23.3	16.0	16.2	23.3						
9	MIL09-DB-O-001	21.9	23.1	33.3	9.0	9.5	13.7	100	35	35			
10	MIL09-DB-O-002	21.9	23.1	33.3	9.0	9.5	13.7	100	35	35			
11	MIL09-DB-O-003	18.2	19.1	27.6	7.0	7.4	10.7	100	35	35			
12	MIL09-DB-O-004	18.2	19.1	27.6	7.0	7.4	10.7	100	35	35			
13	MIL09-DB-O-005	22.2	23.4	33.8	9.2	9.7	14.0	100	35	35			
14	MIL09-DB-O-006	22.2	23.4	33.8	9.2	9.7	14.0	100	35	35			
15	MIL09-DB-O-007	18.2	19.2	27.7	7.0	7.4	10.7	100	35	35			
16	MIL09-DB-O-008	18.2	19.2	27.7	7.0	7.4	10.7	100	35	35			
17	MFAP-O-01	1.5	1.6	6.9	1.5	1.6	6.9	20	35	35			
18	Goods Lift 1	24.0	26.7	38.5	19.2	21.3	30.8	63	35	35			
19	Goods Lift 2	24.0	26.7	38.5	19.2	21.3	30.8	63	35	35			
20	Passenger Lift	24.0	26.7	38.5	19.2	21.3	30.8	40	35	35			
21	MIL09-DB-O-009	18.7	19.6	28.3	9.2	9.7	14.0	100	35	35			
22	MIL09-DB-O-010	33.4	35.2	50.8	6.3	6.7	9.6	100	35	35			
23	MIL09-DB-O-011	33.4	35.2	50.8	6.3	6.7	9.6	100	35	35			
24	MIL09-DBT-O-001	6.6	6.9	10.0	3.5	3.7	5.3	63	35	35			
25	MIL09-DBT-O-002	1.7	1.7	2.5	0.7	0.8	1.1	63	35	35			
26	MIL09-DBT-O-003	3.1	3.3	4.7	0.5	0.5	0.8	63	35	35			
27	MIL09-DBT-O-004	4.6	0.8	1.1	3.5	3.7	5.3	63	35	35			
28	MIL09-MCC-O-001	14.8	17.5	25.2	14.8	17.5	25.2	250	35	35			
29	MIL09-DB-O-012	21.9	23.0	33.2	19.3	20.3	29.3	100	35	35			
30	MIL09-DBT-O-005	10.6	11.2	16.1	6.8	7.2	10.4	63	35	35			
31	MIL09-DB-O-013	21.9	23.0	33.2	19.3	20.3	29.3	100	35	35			
32	MIL09-DBT-O-006	10.6	11.2	16.1	10.6	11.2	16.1	63	35	35			
33	MIL09-SSB-O/V1-001	0.0	0.0	0.0	0.0	0.0	0.0	630	25	25	52	54	78
34	MIL09-DBMEC-O-001	176.3	185.5	267.8	141.0	148.4	214.2	630	280	96			
35	MIL09-DBMEC-O-002	176.3	185.5	267.8	141.0	148.4	214.2	630	280	96			
36	MIL09-FP-O-001	22.8	24.0	34.6	8.8	9.3	13.4	160	35	35			
37	MIL09-FP-O-002	54.8	57.6	83.2	24.8	26.1	37.7	160	35	35			
38	MIL09-FP-O-003	20.8	21.9	31.5	7.8	8.2	11.9	160	35	35			
39	MIL09-FP-O-004	20.8	21.9	31.5	7.8	8.2	11.9	160	35	35			
40	MIL09-FP-O-01-EVC	97.5	102.6	148.1	48.8	51.3	74.1	160	80	35			
41	MIL09-FP-O-02-EVC	52.5	55.3	79.8	26.3	27.6	39.9	160	35	35			
42	MIL09-DB-O-01-EXT	7.0	7.4	10.6	5.6	5.9	8.5	160	35	35			

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MUPS Output Switchboard

Circuit	Load	Total Connected Load			Maximum Demand Load			CPD	Oper Loss	Fail Loss
		kW	kVA	A	kW	kVA	A	A	W	W
	Switchgear Operating Losses								603	555
1	160 kW Static UPS	123.09	126.84	183.07	90.26	95.01	137.13	630	96	80
	With UPS Efficiency @ 0.96%	128.22	129.51	186.94	94.02	94.97	137.07	-	-	-
2	Bus Coupler	128.22	129.51	186.94	94.02	94.97	137.07	630	96	80
3	Maintenance Bypass							630	25	25
4	MIL09-DBC-O-001	6.57	6.92	9.98	2.71	2.85	4.11	63	35	35
5	MIL09-DBC-O-002	6.57	6.92	9.98	2.71	2.85	4.11	63	35	35
6	MIL09-DBC-O-003	5.45	5.73	8.27	2.10	2.21	3.20	63	35	35
7	MIL09-DBC-O-004	5.45	5.73	8.27	2.10	2.21	3.20	63	35	35
8	MIL09-DBMMR-O-001	20.00	21.05	30.39	40.00	42.11	60.77	100	35	35
9	MIL09-DBSOC-O-001	6.10	6.42	9.27	6.10	6.42	9.27	63	35	35
10	MIL09-DBC-O-005	5.60	3.16	4.56	2.76	2.90	4.19	63	35	35
11	MIL09-DBC-O-006	10.03	10.56	15.25	1.90	2.00	2.89	63	35	35
12	MIL09-DBC-O-007	10.03	10.56	15.25	1.90	2.00	2.89	63	35	35
13	MIL09-DBTC-O-001	1.97	2.07	2.99	1.06	1.11	1.60	63	35	35
14	MIL09-DBTC-O-002	0.50	0.52	0.75	0.22	0.23	0.33	63	35	35
15	MIL09-DBTC-O-003	0.93	0.98	1.42	0.15	0.16	0.23	63	35	35
16	MIL09-DBTC-O-004	1.39	1.47	2.12	0.23	0.24	0.35	63	35	35
17	MIL09-DBC-O-008	6.56	6.91	9.97	5.78	6.09	8.78	63	35	35
18	MIL09-DBC-O-009	6.56	6.91	9.97	5.78	6.09	8.78	63	35	35
19	Critical DB	5.00	5.26	7.60	5.00	5.26	7.60	63	35	35
20	MIL09-DBTC-O-005	3.18	3.35	4.83	2.05	2.16	3.11	63	35	35
21	MIL09-DBTC-O-006	3.18	3.35	4.83	2.05	2.16	3.11	63	35	35
22	MIL09-DBC-EXT-O-001	7.96	8.37	12.09	1.99	2.09	3.02	63	35	35
23	MIL09-DBC-EXT-O-002	7.96	8.37	12.09	1.99	2.09	3.02	63	35	35
24	MIL09-DBC-EXT-0-003	2.10	2.21	3.19	1.68	1.77	2.55	63	35	35

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OFFICE LOCATIONS
www.bw-engineering.com/contact

ENQUIRIES
enquiries@bw-engineering.com

B&W WEBSITE
www.bw-engineering.com